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Alcohol Involvement in Homicide Victimization in the U.S

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Abstract

Background—Although the association between alcohol and homicide is well documented, there has been no recent study of alcohol involvement in homicide victimization in U.S. states. The objective of this paper was to determine the prevalence of alcohol involvement in homicide victimization and identify socio-demographic and other factors associated with alcohol involvement in homicide victimization.

Methods—Data from homicide victims with a reported blood alcohol content (BAC) level were analyzed from 17 states from 2010–12 using the National Violent Death Reporting System. Logistic regression was used to investigate factors associated with the odds of homicide victims having a BAC ≥0.08%.

Results—Among all homicide victims, 39.9% had a positive BAC including 13.7% with a BAC between 0.01%–0.79% and 26.2% of victims with a BAC ≥0.08%. Males were twice as likely as females to have a BAC ≥0.08% (29.1% vs. 15.2%; $p < 0.001$). Characteristics that were independent predictors of homicide victims having a BAC ≥0.08 included male sex, American Indian/Alaska Native race, Hispanic ethnicity, history of intimate partner violence, and non-firearm homicides.

Conclusions—Alcohol is present in a substantial proportion of homicide victims in the U.S., with substantial variation by state, demographic and circumstantial characteristics. Future studies should explore the relationships between state-level alcohol policies and alcohol-involvement among perpetrators and victims of homicide.

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Keywords

Homicide Victimization; Alcohol; Blood Alcohol Content (BAC); Violent Death

Introduction

Homicide constitutes a major public health burden in the U.S. In 2013, there were approximately 16,000 homicides (Centers for Disease, 2015b). Additionally, excessive alcohol consumption (i.e., binge drinking, heavy drinking, and any alcohol use by individuals under 21 years of age) is associated with an increased risk of violent death and interpersonal violence (e.g., homicide, assault, domestic violence, rape, and child abuse). (Naimi et al., 2003, Centers for Disease, 2016, National Council on Alcoholism and Drug Dependence, 2015, Darke, 2013, Mokdad et al., 2004, Naimi et al., 2009). The Centers for Disease Control and Prevention's Alcohol-Related Disease Impact (ARDI) application estimated that between 2006–2010 there were 7,756 homicides annually that were attributed to excessive alcohol use (i.e. victims had a BAC > 0.10%). (Centers for Disease and Prevention, 2015a, Centers for Disease and Prevention, 2013).

Many circumstantial factors may contribute to the relationship between alcohol impairment and violence, including heavy drinking in private settings and over-serving in bars and restaurants. The pharmacological effects of alcohol consumption (e.g., impaired judgment, or misinterpretation of social cues) may also contribute to associations between alcohol and aggression (Brewer and Swahn, 2005, Exum, 2006, Chermack, 1997, Chermack, 1995, Centers for Disease, 2016, Martin, 1992). Two distinct models explain the relationship between alcohol and aggression. The pharmacological disinhibition model posits that alcohol intoxication impacts the area of the brain responsible for impulse control, and therefore alcohol-impaired individuals are likely to behave impulsively or aggressively (Exum, 2006). The expectancy model of alcohol-induced aggression proposes that learned beliefs that alcohol causes aggressive behavior may in turn cause aggressive behavior among perpetrators of violence (Chermack, 1995). In addition, there is evidence that alcohol consumption may contribute to victimization by increasing vulnerability (Kuhns et al., 2010, Martin, 1992).

Two international reviews found that homicide victims tested positive for alcohol in 47–48% of cases (Kuhns et al., 2010, Smith, 1999). In an influential study of homicides in Philadelphia, Wolfgang et al. found that 53% of victims had consumed alcohol prior to the violent event, and in 44% of cases, both the victim and the perpetrator had consumed alcohol (Goodman, 1986). A study analyzing 10 years of data in Los Angeles in the 1970s found that when the victim and perpetrator were known to one another, alcohol was detected in the victim in 38–53% of cases (Goodman, 1986). More recently, in a study comparing firearm to non-firearm homicides in New Mexico, a BAC ≥0.08% was detected in 43% of non-firearm homicide victims, 61% of whom were American Indians (Kazerouni et al., 2009).

Although there is substantial between-state variation of alcohol consumption (Naimi et al., 2003), less information is available with respect to between-state variability of alcohol

involvement among homicide victims in the U.S. To our knowledge, the majority of studies analyzing alcohol and homicide victimization in the U.S. have focused on one city or state, or were published prior to 2000 (Goodman, 1986).

The CDC's National Violent Death Reporting System (NVDRS) is a unique state-specific database that captures information on a wide variety of personal and precipitating circumstances for each violent death, including BAC. The objectives of this study were to use recent NVDRS data to: a) quantify the prevalence of alcohol involvement by various BAC levels among homicide victims by demographic and circumstantial (e.g. victim prior mental health or substance abuse problem) characteristics; b) identify state-based variability in the prevalence of alcohol involvement among homicide victims; and c) identify demographic and circumstantial characteristics associated having a BAC ≥0.08% among homicide victims.

Materials and Methods

Data Source

This study used data from the NVDRS from 2010–2012. NVDRS is a population-based surveillance system that provides information about all violent deaths that occur among residents and nonresidents of participating U.S. states. Each victim record includes information about the victim, suspect(s), the relationship of the victim to the suspect(s), toxicology results for the victim (if available), and any weapon(s) that were involved in the incident. Required primary sources of NVDRS data include death certificates, coroner/medical examiner records including toxicology reports, and other law enforcement reports (Centers for Disease, 2015a). Secondary or optional sources include Child Fatality Review team data (report includes case status and death scene information, suspect and family member criminal histories, expertise on law enforcement practices, and information from any other law enforcement agencies), information on intimate partner violence (IPV), crime lab data, and hospital medical records (Centers for Disease, 2015a). Data abstractors review all available sources of information for each victim to determine the manner of death (e.g., homicide, suicide, etc.). As recommended by the CDC, homicides were classified based on abstractor-assigned manner of death (Petrosky, 2015).

Seventeen states participated in NVDRS from 2010–2012 for a total of 51 state-year strata with a total of 13,337 homicide victims. Alcohol data was derived from toxicology reports and reported as a BAC, which was measured in milligrams per deciliter divided by 1000. For example, a level of 30 mg/dl is equivalent to BAC of 0.03%. Among all homicide victims, 9475 (71%) were tested for alcohol and among those tested 7885 (83%) had a recorded BAC (4742 with BAC = 0.0%, 1081 with BAC > 0.0% ≤ 0.079%, 2062 with BAC ≥ 0.08%). Those with missing BAC levels were excluded from analysis. Because BAC testing or reporting rates may vary by state and year and because lower testing rates may be associated with selection bias, we also conducted sensitivity analyses in which we excluded state-years with <60% BAC reporting or <70% BAC testing. The sensitivity analysis included 34 state-years and 6509 homicides for analysis.

Among homicide victims data about BAC levels, demographic characteristics, circumstantial characteristics, and details about the method of homicide were assessed. We analyzed the prevalence and odds of alcohol involvement among homicide victims for BAC > 0.0% and for BAC ≥ 0.08% (i.e., the legal definition of alcohol intoxication). A homicide was termed "alcohol-involved" if the victim had a BAC > 0.0%, although a BAC at either level was not meant to imply that alcohol was necessarily a causal factor. BAC values in the study population ranged 0.0% to 0.9% in the study population. Socio-demographic variables included: gender, age, race, education, veteran status, marital status (divorced/separated, married/civil union, never married/single, widowed), metropolitan status (nine categories ranging from '1' [counties in metropolitan areas of 1 million population or more] to '9' [completely rural counties or those with <2500 urban population, not adjacent to a metropolitan area] that were collapsed into two categories: metropolitan [codes 1 through 3] and nonmetropolitan [codes 4 through 9]), mental health problem ("victim was identified as having a mental health problem other than an alcohol or substance abuse problem, according to DSM-IV classification"), substance abuse problem ("victim was perceived by self or others to have a problem with, or to be addicted to drugs other than alcohol"), relationship to perpetrator (family member, intimate partner, other), prior record of intimate partner violence, and manner of death (firearm or non-firearm homicide) (Centers for Disease, 2015a).

Statistical Methods

Prevalence rates, presented as percentages, were calculated for each socio-demographic and circumstantial variable by BAC category using SAS version 9.3 (SAS Institute, Inc., NC, USA). Data were not weighted, as the sample represented all reported homicides in each of 17 states from 2010–2012. State homicide rates were calculated using state populations according to the 2010 U.S. Census. Multivariable logistic regression analyses were conducted to investigate factors associated with the odds that a homicide victim had a BAC ≥ 0.08%. The final regression analysis included the following variables: gender, age, race, education, veteran status, marital status, metropolitan status, mental health problem, substance abuse problem, firearm, and prior record of intimate partner violence. Due to collinearity between the variables relationship to perpetrator and prior record of intimate partner violence, relationship to perpetrator was removed from the regression analysis. To account for potential bias due to missing BAC data, we conducted a sensitivity analysis excluding state-years with <60% BAC reporting or <70% BAC testing. All reported p values are two-sided and were considered significant at $p < 0.05$.

Results

Demographic Characteristics

Among all homicide victims, 39.9% had a positive BAC, including 13.7% with a BAC from 0.01%–0.79% and 26.2% with a BAC ≥0.08% (Table 1). Male victims were more likely than females to have a BAC >0.0%, and were twice as likely to have a BAC ≥0.08% (29.1% vs. 15.2%; $p < 0.001$). Overall, there were more than five times as many male homicide victims with a positive BAC (2687) as there were females with a positive BAC (456). By age, homicide victims aged 21–29, 30–39, and 40–49 years all had a similarly high prevalence of

any alcohol involvement, with victims aged 40–49 years having the highest prevalence of having a BAC ≥0.08% (34.0%). However, those aged 21–29 accounted for the largest number of alcohol-involved homicide victims compared with other age groups. Because higher BAC levels may be related to increased risk, mean blood alcohol levels among alcohol-involved homicide victims were assessed by sex and age (Figure 1). Among alcohol-involved homicides, males had higher mean BAC compared to females among all age groups, and males in the two oldest age categories had the highest average BAC (0.16%). In an additional analysis restricted to homicide victims with a BAC ≥0.08%, males older than 40 years also had the highest mean BAC (0.21%), and (data not shown). While those of white and black race had a similar prevalence of alcohol involvement in homicide victimization, blacks accounted for more alcohol-involved homicide victims (1427) than any other racial or ethnic group including whites (971) (Table 1). However, American Indian/Alaska Natives had the highest proportion of homicide victims with alcohol involvement, including 60.4% of all homicide victims having a BAC ≥0.08%.

Other Characteristics

Married and widowed victims had a lower prevalence of BAC ≥0.08% (26.2% and 16.3%, respectively) compared with victims who were divorced/separated or single/never married (55.6% and 55.1%, respectively) (Table 1). Victims with mental health problems and those who had experienced lifetime intimate partner violence were as likely as victims without mental health problems or a history of lifetime intimate partner violence to have BAC ≥0.08%. Victims with a recognized prior substance abuse problem were more likely to have BAC ≥0.08% compared to those without a prior substance abuse problem (30.7% vs. 25.8%, $p<0.001$).

A sensitivity analysis excluding state-years with <60% BAC reporting or <70% BAC testing yielded results with slightly lower rates of alcohol involvement compared with the results reported in Table 1 (Appendix 1). For example, the proportion of homicide victims with BAC >0.00–0.079% was 13.7% for all state-years versus 11.9% in the sensitivity analysis, and the proportion of homicide victims with BAC ≥0.08% was 26.2% for all state-years versus 23.9% in the sensitivity analysis.

Between-State Variation

By state, there was considerable variation in the proportions of homicide victims with a BAC ≥0.08% (Table 2). Alaska, South Carolina, and New Jersey had the highest proportions (70.6%, 58.0% and 50.8%, respectively), while Massachusetts, Utah, and Oklahoma had the lowest proportions (19.4%, 20.9% and 21.5%, respectively).

Factors Associated with having a BAC ≥ 0.08% among Homicide Victims

Homicide victims with significantly increased adjusted odds of having a BAC ≥ .08% included men (adjusted odds ratios [AOR] = 3.01), those older than age 21 (e.g., AOR = 3.86 among those aged 30–39 years), American Indian/Alaska Natives (AOR = 3.39) and Hispanics (AOR = 1.27), those with higher educational attainment (AOR = 1.22), non-married persons (AOR = 1.17), those living in rural areas (AOR = 1.16), those with reported intimate partner violence (AOR = 1.32), and victims of non-firearm homicides (Table 3).

However education, marital status, and metropolitan status were no longer significant when performing significance testing using Bonferroni-corrected p-values instead of 95% confidence intervals. There was no significant difference in the adjusted odds of homicide victimization among individuals with histories of prior substance abuse problems, prior mental health problems, or being a military veteran.

In a sensitivity analysis replicating Table 3 but excluding state-years with <60% BAC reporting rates or <70% testing rates, results were very similar to those involving all state-years. For example, the adjusted odds for male victims in the sensitivity analysis was 3.02 (95% CI = 2.50, 3.66) compared to 3.01 (95% CI = 2.53–3.57) for the analysis reported in Table 3.

Discussion

This is the first study in more than a decade to examine alcohol involvement in homicide victimization across multiple U.S states. Overall, approximately 40% of homicide victims had a positive BAC, and of those two-thirds had BACs ≥0.08%. These findings are largely consistent with findings from older studies (Darke, 2010, Kuhns et al., 2010, Goodman, 1986, Lindqvist, 1986). Despite the high rates of alcohol involvement among victims, it should be noted that our study underestimates the role of alcohol in homicide overall because we did not have information about alcohol involvement among perpetrators.

Overall, there were more than five times as many male victims with BAC >0.0% as female victims, and male homicide victims had higher average BACs. Younger victims aged 21–29 years and black victims accounted for the largest numbers of alcohol-involved homicide victims, and the largest number of homicide victims with a BAC ≥0.08%. However, American Indians/Alaska Natives homicide victims had the highest prevalence of alcohol-involvement, and in multivariable models black race was a protective factor for having a BAC ≥0.08%. This discrepancy are largely due to the demographic distribution of homicide victimization, and is consistent with the evidence base that the burden of homicide victimization falls disproportionately on blacks, despite lower drinking prevalence among blacks compared to other races (Caetano et al., 2013, Xuan et al., 2013).

We also found that there were nearly twice the number of alcohol-involved firearm homicide victims compared to non-firearm homicide victims, including more firearm homicide victims with a BAC ≥0.08%. Despite these results, there was a significant increase in odds of alcohol-involved victimization in non-firearm homicides, particularly among victims with a BAC ≥ 0.08%. This is consistent with a study of non-firearm related homicides in New Mexico, in which victims of non-firearm homicides with a BAC ≥0.08% had significantly increased odds of victimization (Kazerouni et al., 2009). Additionally, this study found also that a far greater proportion of American Indians had impairment-level BACs compared to victims of other races. Another U.S. study found that alcohol was detected in 43.5% of stabbing homicide victims versus 25.1% of handgun victims (Goodman, 1986).

This study is subject to several limitations. This study was limited to 17 states, so findings may not be generalizable to all states, although the analysis included states from all U.S.

census regions. Second, incomplete BAC testing and reporting may be a source of bias due to selective testing. For example, states with less complete BAC testing may be more selective and be more likely to test when alcohol involvement is already suspected. To address this potential limitation, we conducted a sensitivity analysis in which states with substantial missing data were excluded. We found only small to modest differences in state-years in both prevalence of BAC ≥0.08% and odds of alcohol-involved homicide victimization. Third, the NVDRS attempts to capture all data on homicides by aggregating information from death certificates, coroners, medical examiners, and law enforcement. There is a possibility that not all homicide events are coded as such and therefore are not included in the final dataset. Fourth, ascertainment of medical history, mental health and substance abuse history was incomplete for a number of individuals in the dataset. Therefore, this study may underrepresent these variables.

Future work should assess the relationship between alcohol policies and alcohol-involved homicides. Given the high prevalence of homicides that involve BACs ≥0.08%, it would be prudent for states to adopt alcohol policies that target binge drinking (i.e., drinking at levels that typically result in alcohol impairment) (Naimi et al., 2003). Alcohol control policies that have strong evidence of reducing binge drinking and alcohol-related harms include alcohol taxes, reductions in alcohol outlet density, limits on the hours of alcohol sales, and mandatory server training programs (Centers for Disease and Prevention, 2015b, Toomey and Wagenaar, 1999, Graham et al., 2004). Several studies have found a positive relationship between alcohol outlet density and violence, and that reducing alcohol availability has significantly reduced homicides in communities (Parker, 2011, Campbell et al., 2009, Escobedo, 2002). Future studies should examine the relationship between multiple alcohol policies— and the independent relationships of individual policies within the context of the larger policy environment—with alcohol-involved homicide victimization.

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Appendix 1. Demographic characteristics by BAC level among homicide victims, excluding state-years with <60% BAC reporting or <70% testing rates, 2010–2012, 14 states, 34 state years

Variable	Total Number of Homicides with BAC Testing	BAC > 0 ≤ .079 % (n)	BAC ≥ .08[a] % (n)	p-value[a]
Overall	6509	11.9% (774)	23.9% (1554)	
Gender				<0.001
Male	5070	12.4% (631)	26.7% (1353)	
Female	1439	9.9% (143)	14.0% (201)	
Age				<0.001
<21	1228	7.8% (96)	10.6% (130)	

Variable	Total Number of Homicides with BAC Testing	BAC > 0 ≤ .079 % (n)	BAC ≥ .08[a] % (n)	p-value[a]
21–29	1850	14.2% (263)	25.4% (470)	
30–39	1286	13.4% (172)	29.4% (378)	
40–49	966	12.5% (121)	32.4% (313)	
≥50	1179	10.3% (122)	22.3% (263)	
Race				<0.001
White Non-Hispanic	2158	9.5% (204)	24.7% (532)	
Black Non-Hispanic	2946	15.8% (393)	20.6% (606)	
American Indian/Alaska Native Non-Hispanic	172	12.2% (21)	59.9% (103)	
Asian/Pacific Islander Non-Hispanic	84	8.3% (7)	10.7% (9)	
Hispanic	779	13.0% (101)	28.5% (222)	
Education				<0.001
<12 years	1344	10.1% (136)	19.6% (263)	
12 or more years	1993	12.0% (240)	25.3% (504)	
Veteran				0.132
Yes	396	11.6% (46)	27.5% (109)	
No	5550	11.7% (647)	23.8% (1321)	
Missing	563	14.4% (81)	22.0% (124)	
Marital Status				<0.001
Married/Civil Union	1226	11.2% (137)	23.6% (289)	
Divorced/Separated	829	19% (81)	45.9% (243)	
Single/Never Married	4229	19.2% (533)	54.2% (979)	
Widowed	186	8.6% (16)	17.7% (33)	
Metropolitan Status				<0.001
Yes	5199	12.0% (623)	22.5% (1171)	
No	1243	11.7% (145)	29.2% (363)	
Mental Health Problem				0.858
Yes	185	10.8% (20)	23.2% (43)	
No	6324	11.9% (754)	23.9% (1511)	
Substance Abuse Problem				<0.001
Yes	477	17.0% (81)	27.5% (131)	
No	6032	11.5% (693)	23.6% (1423)	
Victim Relationship to Suspect				<0.001
Intimate Partner	848	9.7% (82)	23.5% (199)	
Family Member	573	8.7% (50)	16.9% (97)	
Other	2313	11.8% (274)	27.5% (635)	
Firearm				<0.001
Yes	4389	12.6% (555)	20.9% (919)	
No	2102	10.4% (219)	30.1% (633)	
Intimate Partner Violence				0.127
Yes	1090	10.1% (110)	24.7% (269)	
No	5419	12.3 % (664)	23.7% (1285)	

[a]Chi-Square testing utilized for categorical variables to assess significant differences in demographic variables in each BAC category

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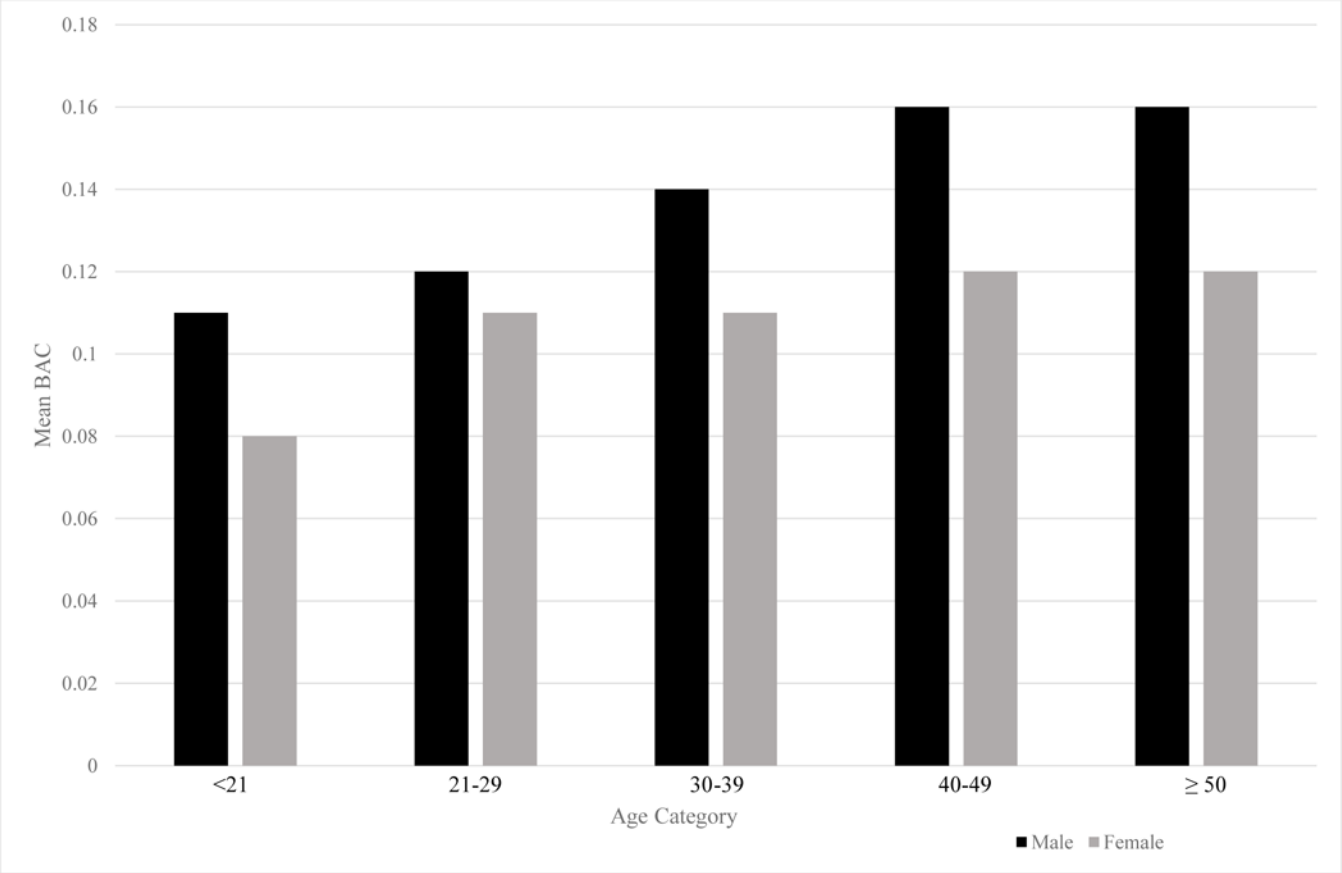

Figure 1.
Mean BAC level for homicide victims with any alcohol involvement (BAC >0.00%), by age and gender, 17 states, National Violent Death Reporting System, 2010–2012

Table 1

Prevalence of alcohol-involved homicide victimization by BAC level, and by demographic and circumstantial characteristics, 17 states, National Violent Death Reporting System, 2010–2012

Variable	Number of Homicides with BAC testing	BAC > 0% ≤ .079% % (n)	BAC ≥ .08% % (n)	p-value[a]
Overall	7885	13.7% (1081)	26.2% (2062)	
Gender				<0.001
Male	6202	14.2% (881)	29.1% (1806)	
Female	1683	11.9% (200)	15.2% (256)	
Age				<0.001
<21	1414	8.6% (121)	11.3% (160)	
21–29	2270	16.5% (374)	27.2% (618)	
30–39	1601	15.4% (247)	32.6% (522)	
40–49	1158	14.3% (166)	34.0% (394)	
≥50	1442	12.0% (173)	25.5% (368)	
Race				<.001
White Non-Hispanic	2561	11.1% (284)	26.8% (687)	
Black Non-Hispanic	3629	15.8% (572)	23.6% (855)	
American Indian/Alaska Native Non-Hispanic	182	12.1% (22)	60.4% (110)	
Asian/Pacific Islander Non-Hispanic	90	8.9% (8)	12.2% (11)	
Hispanic	928	14.2% (132)	31.3% (290)	
Education				<.001
<12 years	1768	12.4% (219)	22.7% (401)	
12 or more years	2653	15.3% (407)	28.9% (766)	
Veteran				0.041
Yes	469	13.2% (62)	31.1% (146)	
No	6717	13.7% (919)	26.1% (1756)	
Unknown	699	22.9% (160)	14.3% (100)	
Marital Status				<.001
Married/Civil Union	1452	12.4% (180)	26.2% (381)	
Divorced/Separated	2034	21.1% (120)	55.6% (345)	
Single/Never Married	5040	20.0% (730)	55.1% (1267)	
Widowed	233	13.3% (31)	16.3% (38)	
Metropolitan Status				<.001
Yes	6369	13.9% (887)	24.9% (1584)	
No	1417	12.8% (181)	31.1% (440)	
Mental Health Problem				0.435
Yes	213	11.7% (25)	23.9% (51)	
No	7672	13.8% (1056)	26.2% (2011)	
Substance Abuse Problem				<.001
Yes	576	17.9% (103)	30.7% (177)	
No	7309	13.4% (978)	25.8% (1885)	
Victim Relationship to Suspect				<.001

Variable	Number of Homicides with BAC testing	BAC > 0% ≤ .079% % (n)	BAC ≥ .08% % (n)	p-value[a]
Intimate Partner	972	11.3% (110)	24.3% (236)	
Family Member	650	10.5% (68)	17.7% (115)	
Other	2615	13.6% (356)	29.0% (759)	
Firearm				<.001
Yes	5299	14.5% (771)	23.0% (1221)	
No	2548	12.0% (307)	32.7% (832)	
Intimate Partner Violence				0.071
Yes	1243	11.7% (146)	26.0% (323)	
No	6642	14.1% (935)	26.2% (1739)	

[a]Chi-Square testing utilized for categorical variables to assess significant differences in demographic variables in each BAC category.

Table 2

Overall state homicide rates, and prevalence of homicide victims having a BAC ≥ 0.08 overall and by gender, 17 states, National Violent Death Reporting System, 2010–2012

State	Homicide Rate (per 100,000 population)[a]	BAC ≥0.08%, All Victims n = 7885 % (n)	BAC ≥0.08%, Men n = 6202 % (n)	BAC ≥0.08%, Women n = 1683 % (n)
Alaska	15.2	70.6% (36)	74.4% (29)	58.3% (7)
South Carolina	22.9	58.0% (98)	63.6% (91)	26.9% (7)
New Jersey	13.3	50.8% (67)	55.2% (64)	18.8% (3)
Colorado	11.2	37.5% (119)	41.2% (103)	23.9% (16)
New Mexico	21.6	36.0% (140)	37.1% (122)	23.4% (18)
Oregon	9.1	34.3% (75)	38.4% (56)	26.0% (19)
Rhode Island	7.3	27.5% (19)	30.2% (16)	18.8% (3)
Kentucky	12.8	25.1% (92)	27.1% (77)	18.3% (15)
North Carolina	17.1	25.0% (353)	28.0% (305)	15.0% (48)
Ohio	10.8	24.5% (169)	27.2% (156)	11.1% (13)
Wisconsin	8.3	24.5% (100)	27.1% (89)	13.9% (11)
Georgia	20.5	22.6% (68)	23.9% (57)	17.7% (11)
Virginia	12.7	22.4% (217)	26.6% (193)	9.9% (24)
Maryland	21.1	22.1% (228)	23.5% (206)	14.2% (22)
Oklahoma	19.6	21.5% (144)	25.6% (130)	8.7% (14)
Utah	5.6	20.9% (32)	27.3% (24)	12.3% (8)
Massachusetts	8.5	19.4% (105)	20.5% (88)	15.2% (17)

[a]Rate per 100,000 indicates (number of homicide deaths/population from 2010 U.S. Census)*100,000

Table 3

Odds of having a homicide victim having a BAC ≥ 0.08% by demographic and circumstantial characteristics, 17 states, National Violent Death Reporting System, 2010–2012

Variable	OR (95% CI)	AOR[a] (95% CI)
Gender		
Female	ref	ref
Male	2.29 (1.98, 2.64)	3.01 (2.53, 3.57)
Age		
< 21	ref	ref
21–29	2.93 (2.43, 3.54)	3.02 (2.48, 3.70)
30–39	3.79 (3.12, 4.61)	3.86 (3.13, 4.75)
40–49	4.04 (3.29, 4.96)	3.81 (3.04, 4.76)
≥ 50	2.69 (2.19, 3.29)	2.53 (2.01, 3.17)
Race		
White non-Hispanic	ref	ref
Black non-Hispanic	0.84 (0.75, 0.94)	0.85 (0.74, 0.98)
American Indian/Alaska Native non-Hispanic	4.17 (3.06, 5.68)	3.39 (2.42, 4.75)
Asian/Pacific Islander non-Hispanic	0.73 (0.58, 0.93)	0.82 (0.64, 1.06)
Hispanic	1.24 (1.05, 1.46)	1.27 (1.06, 1.53)
Education		
< 12 years	ref	ref
12 or more years	1.38 (1.20, 1.59)	1.22 (1.05, 1.43)
Veteran		
No	ref	ref
Yes	1.28 (1.04, 1.56)	1.02 (0.82, 1.28)
Unknown	0.84 (0.70, 1.01)	0.83 (0.67, 1.03)
Marital Status		
Married/Civil Union	ref	ref
Unmarried (separated, divorced, widowed, single)	1.00 (0.88, 1.14)	1.17 (1.01, 1.35)
Metropolitan Status		
Yes	ref	ref
No	1.36 (1.20, 1.54)	1.16 (1.01, 1.34)
Mental Health Problem		
No	ref	ref
Yes	0.89 (0.64, 1.22)	0.76 (0.54, 1.07)
Substance Abuse Problem		
No	ref	ref
Yes	1.28 (1.06, 1.54)	1.06 (0.87, 1.29)
Firearm		
Yes	ref	ref
No	1.62 (1.46, 1.80)	1.88 (1.67, 2.12)
Intimate Partner Violence		

Variable	OR (95% CI)	AOR[a] (95% CI)
No	ref	ref
Yes	0.99 (0.86, 1.14)	1.32 (1.12, 1.55)

[a]AOR indicates Adjusted odds ratio